# Modular Mini Chiller Service Manual

# （T1/R410A/50Hz）

GREE ELECTRIC APPLIANCES INC. OF ZHUHAI

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# PRODUCT

# PRODUCT INTRODUCTION

## 1 MODELS LIST

1.1 Integral Type

| Model | | Nominal Capacity | Power Supply | Appearance |
|---|---|---|---|---|
| Refrigerant | Model Name | kW | (V,Ph,Hz) | |
| R410A | HLR35SM/NaA-M | 35 | 380 415V, 3Ph, 50Hz | |
| | HLR45SM/NaA-M | 45 | | |

Note:1Ton =12000Btu/h = 3.517kW

## 2 NOMENCLATURE

2.1 Integral Type

HL R 35 S M Na - M
1 2 3 4 5 6 7

| NO. | Description | Options |
|---|---|---|
| 1 | Mini chiller | - |
| 2 | Product type | R=Heat pump |
| 3 | Nominal Cooling Capacity | 35=35kW<br>45=45kW |
| 4 | Refrigeration Circuits | Default=One circuit<br>S=Twin circuit |
| 5 | Module | - |
| 6 | Refrigerant | Na=R410A, Default=R22 |
| 7 | Voltage | M=380 415V 3Ph 50Hz |

## 3 FUNCTION

| Indoor Unit Type | Function | Description |
|---|---|---|
| **Integral Type** | Heating/Cooling | Interface kit for up to 16 indoor units<br>Memory restart<br>Two circuits optimized design<br>Low noise design<br>Safety and reliability thanks to advance compressor balance control |

# 4 PRODUCT DATA

## 4.1 Product Data at Rated Condition

### 4.1.1 Integral Type

| Models | | | HLR__SM/NaA-M | |
|---|---|---|---|---|
| | | | 35 | 45 |
| Capacity | Cooling | kW | 31 | 42 |
| | | Btu/h | 105772 | 143303 |
| | | RT | 8.8 | 11.9 |
| | Heating | kW | 36 | 49 |
| | | Btu/h | 122832 | 167187 |
| | | RT | 10.3 | 13.9 |
| Power input | Cooling | kW | 11.9 | 18.3 |
| | Heating | kW | 12.5 | 17.5 |
| Power Supply | | | 380~415V,3Ph,50Hz | |
| Safeties | | | Auto air evacuation valve | Safety valve; Auto water replenishing valve; Auto air evacuation valve |
| Refrigerant | Type | | R410A | |
| | Charge | kg | 6.5X2 | 7.3X2 |
| Compressor | Type | | scroll | |
| | NO. | | 2 | 2 |
| Evaporator | Heat Exchanger | | Shell and tube | Shell heat exchanger |
| | Water In/Out Pipe Diameter | inch | 1-1/2” | |
| Condenser | Heat Exchanger | | Aluminum fin-copper tube | Fin sleeve Heat exchanger |
| | Fan Motor Power Input | kW | 0.6 | 0.8 |
| Pump | Water Flow | L/s | \ | 2.2 |
| | | GPM | \ | 29 |
| | Delivery Lift | m | \ | 27 |
| | Power Input | kW | \ | 1.5 |
| Expansion Vessel Volume | | L | \ | 8 |
| Dimension | Outline(WxDxH) | mm | 1750×800×1760 | 1750×800×1760 |
| | Packaged(WxDxH) | mm | 1910×960×1970 | 1910×960×1970 |
| Net/Gross Weights | | kg | 600/610 | 755/765 |

NOTE：

1、Cooling capacity is based on the following conditions：leaving chilled water temp.7℃,outdoor air temp.35℃

2、Heating capacity is based on the following conditions：leaving warmed water temp.45℃, outdoor air temp.7℃

3、Water flow range for operation must be from 70% to 120% of the rated water flow。

4、The maximum allowable pressure for water pipe is 0.9MPa

4.2 Operation Range

| Mode | Range of Outdoor Temperature℃ (°F) |
|---|---|
| Cooling | 16~48 |
| Heating | -15~28 |

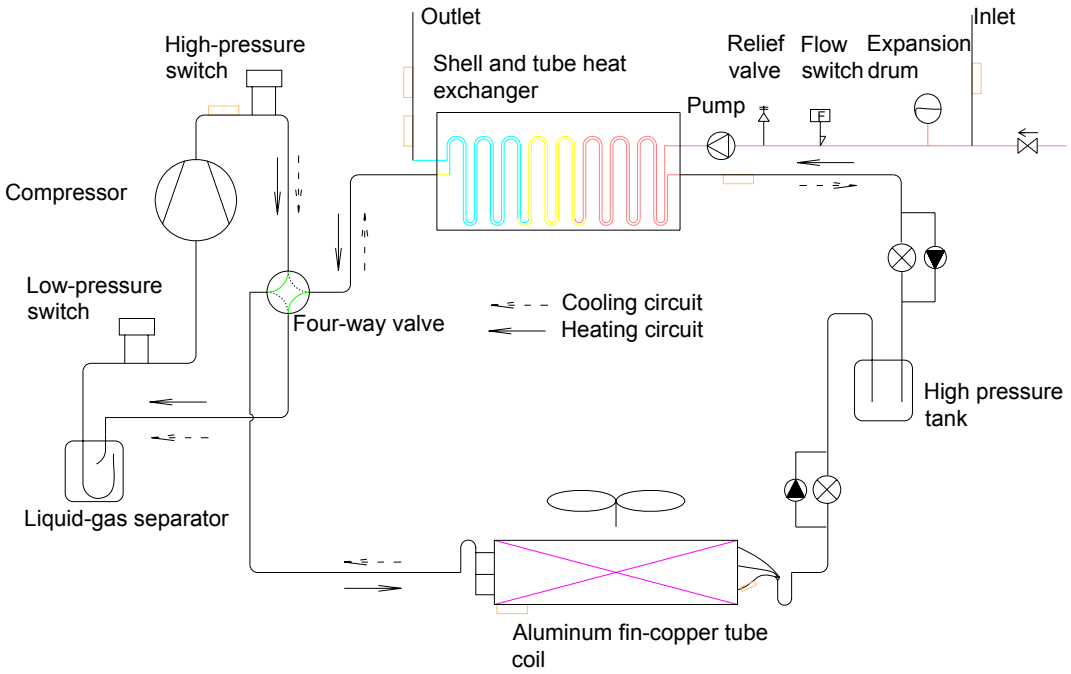
4.3 Electrical Data

4.3.1 Integral Type

| Model | Rated Power Supply | Compressor | | | Fan Motor | | Total | |
|---|---|---|---|---|---|---|---|---|
| | | NO. | LRA each (A) | MRC each (A) | NO. | MRC (A) | MRC (A) | NRC (A) |
| HLR35SM/NaA-M | 380~415V 3Ph 50Hz | 2 | 101 | 17.3 | 2 | 1 | 36.6 | 26.3 |

Notes:
LRA: Locked rotor amps (A)
MRC: Maximum running current (A)
NRC: Nominal running current (A)

## 5 PIPING DIAGRAM

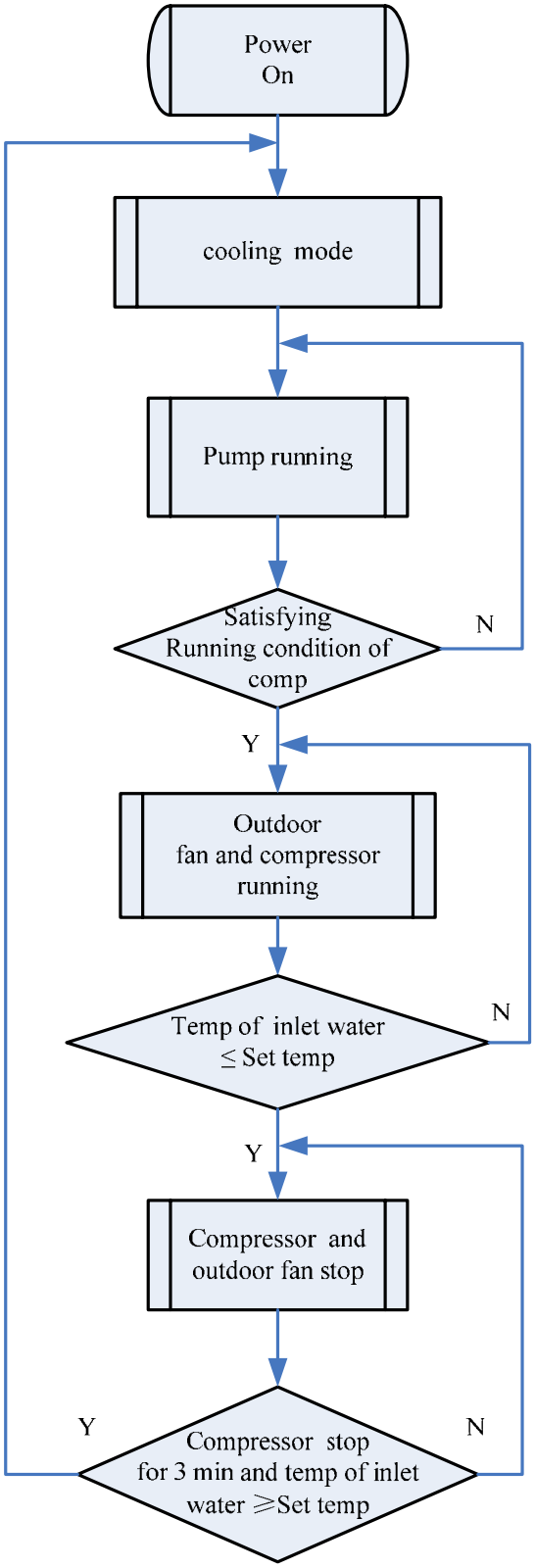


# CONTROL

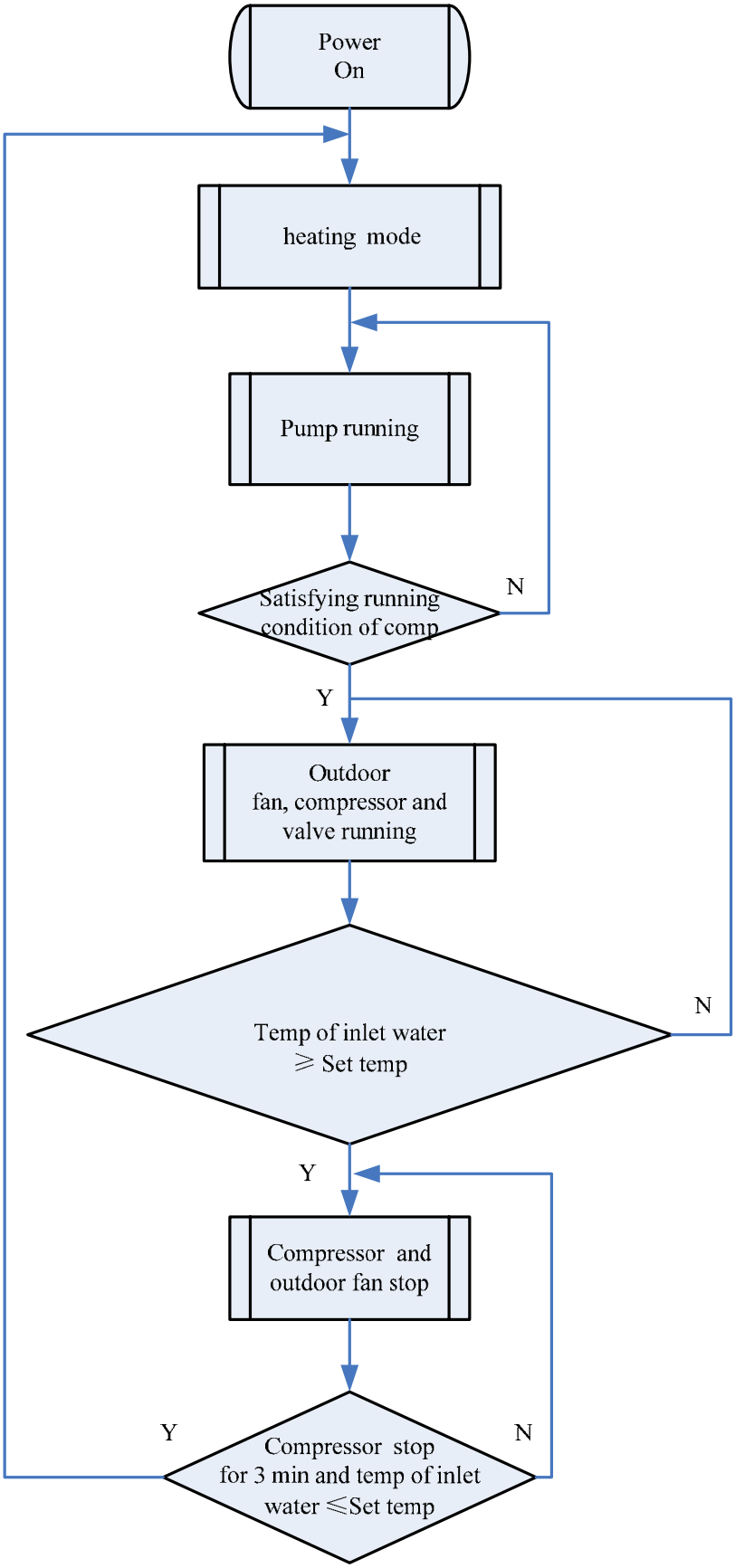
# UNITS CONTROL

## 1 OPERATION FLOWCHART

1.1 Cooling Operation



## 1.2 Heating Operation



# 2 MAIN LOGIC

## 2.1 Cooling Mode

### 2.1.1 Control of Compressor

#### （1）Start-stop Control--- “first start, first stop; first stop, first start”

During running of the unit, the compressor is numbered instantly. It is controlled according to the principle of “first start, first stop; first stop, first start”.

#### （2）Water Temperature Drop (Rise) Rate Control

The water temperature interval is the main control, while the temperature drop (rise) rate is the auxiliary control. This can adapt to the load variation of the terminal, keeping water temperature stable and avoiding fierce variation. In this control mode, the system is based on the temperature and temperature drop rate: when the water temperature is too high and if the temperature drop is rapid, it means the output load is bigger than the terminal load. In that case, it is not necessary to startup the other compressor. The temperature interval and temperature drop is decided by experience, other theories and test so that the water temperature can be kept stable and frequent stop can be avoided.

### 2.1.2 Anti-freezing Protection

For each module, when the anti-freezing temperature is lower than the required value for protection, the anti-freezing protection will start then the compressor of this module will stop. When the anti-freezing temperature is higher than the required value for resume, this system will eliminate the anti-freezing protection.

When the anti-freezing temperature is between the above two temperature, it will not affect the anti-freezing protection.

If the unit is low temperature unit, the anti-freezing protection is invalid.

### 2.1.3 Stop of the Unit

Stop the unit manually or via timer: the compressor stops and then the fan stops. After certain control time, the water pump will stop.

Stop the unit upon reaching a temperature spots: the compressor stops and then the fan stops (on condition that both compressor stops). The water pump will not stop.

Disorderly closedown: the compressor stops and then the fan stops (except the malfunction of the fan). After the corresponding compressor stops for a period. The water pump will not stop.

## 2.2 Heating Mode

### 2.2.1 Control of Compressor

The control principle is the same with that of cooling mode.

### 2.2.2 Superheat Protection

For each module, when the superheat temperature is higher than the required value for protection, the superheat protection will start then the compressor of this module will stop. When the superheat temperature is lower than the required value for resume, this system will eliminate the superheat protection.

When the superheat temperature is between the above two temperature, it will not affect the superheat protection.

### 2.2.3 Control of Auxiliary E-heater

If the control function of auxiliary e-heater is switched on in the display board, it can be controlled automatically according to the inflow water temperature. It is necessary to set an interval to restart the e-heater.

When the temperature detected by inflow water temperature sensor is ≤T1, the second group of auxiliary e-heaters will work.

When the inflow water temperature is ≥T2, the second group of auxiliary e-heaters will stop.

When the inflow water temperature is between the above two temperature, the second group of auxiliary e-heaters remain the original state.

When the temperature detected by inflow water temperature sensor is ≤T1+tr0, the first group of auxiliary e-heaters will work.

When the inflow water temperature is ≥T2+tr1, the first group of auxiliary e-heaters will stop.

When the inflow water temperature is between the above two temperature, the first group of auxiliary e-heaters remain the original state.

After startup of the unit, the auxiliary e-heater will work after all the compressor runs for a certain period and all the above condition is reached.

2.2.4 **Stop of the Unit (subject to the stop of the compressor)**

Stop the unit manually or via timer: the compressor, the auxiliary e-heater and the fan stops in sequence. After certain setting time, the four-way valve will be de-energized and the water pump will stop.

Stop the unit upon reaching the temperature spots: the compressor stops and then the fan stops. The four-way valve will remain the original state and the water pump will not stop.

Disorderly closedown: the compressor stops and then the fan stops (unless the fan is wrong). After the corresponding compressor stops for a period. The water pump will not stop while the four-way valve will remain the original state.

### 2.3 Anti-freezing Running

Under the stop state of any mode (except manual defrosting mode), the automatic anti-freezing function can be switched on via the display board. The defaulted setting of this function is OFF.

For all the modules that reach automatic anti-freezing running condition, the compressor will run according to the setting condition and the regulation of “run for 6min and stop for 4 min”.

### 2.4 Control of Compressor

All compressors run according to the principle of “first start, first stop; first stop, first start”. For other information, refer to the control section of 1.3.1 and1.3.2.

### 2.5 Control of Four-way Valve

In cooling mode, the four-way valve is off. In heating mode, the four-way valve will run after the corresponding compressor runs. In defrosting mode, the four-way valve will be off. When eliminating the defrosting function, the four-way valve runs. When stop the unit, the four-way valve will stop after the corresponding compressor stops.

### 2.6 Control of Water Pump

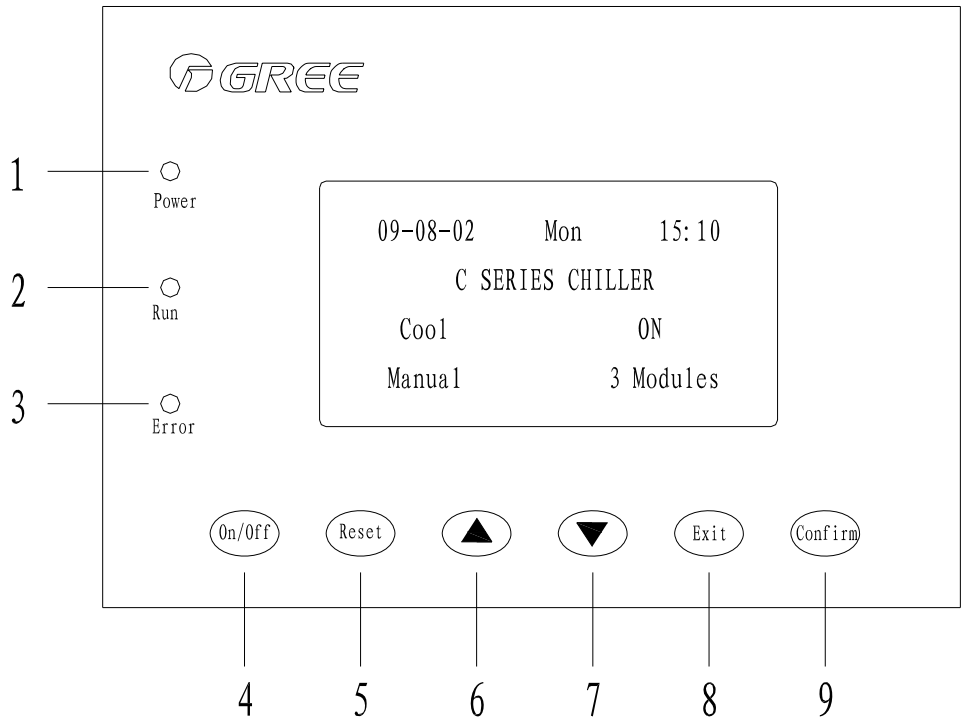
When any of the modules needs to be started up, all the water pumps will run. When one module stops upon reaching certain temperature spots, all the water pumps remain running. When one module is stopped manually or via timer or due to malfunction, the water pump of this module remains running. Only when all the modules are stopped manually or via timer, the water pump will stop 5 min after all the compressor stops.

# 3 WIRED REMOTE CONTROLLER

## 3.1 Function

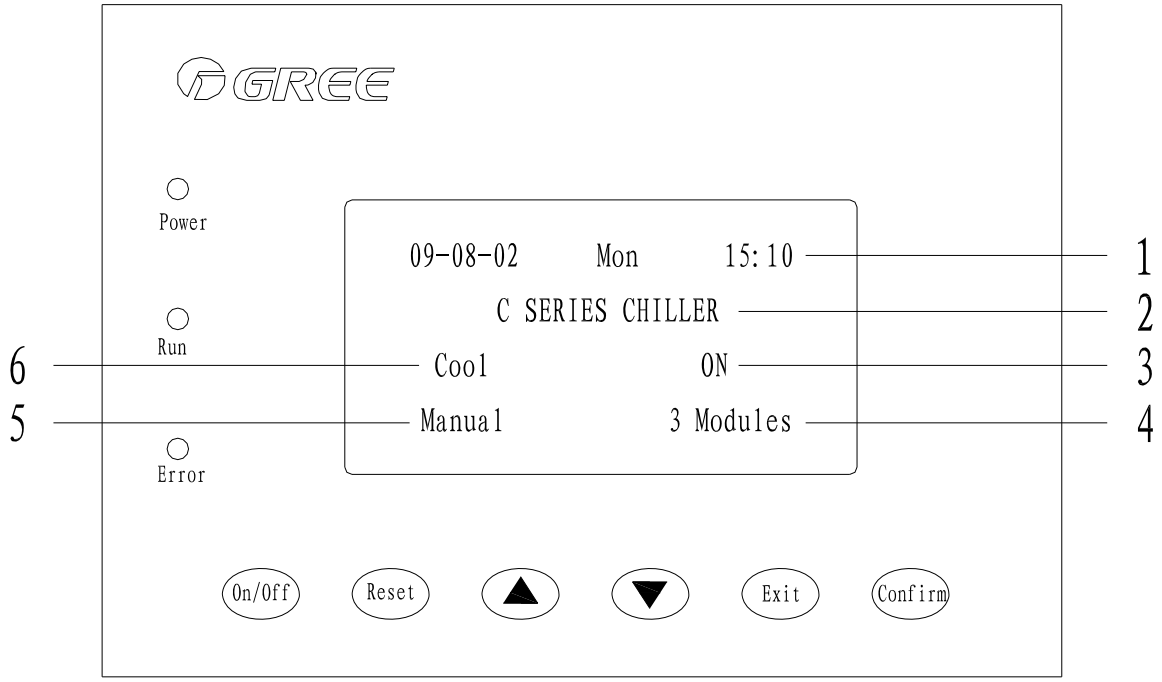
The display of modular air-cooled scroll chiller shows the running parameter in real time. It can be connected with the remote control system.

## 3.2 Operation View




| NO. | Name | Function description |
|---|---|---|
| 1 | Power LED (red) | When the display board is energized, this LED lights; otherwise, it is dark. |
| 2 | Running LED (green) | When the display board is turned on, this LED lights; otherwise, it is dark. |
| 3 | Error LED (red) | When there is malfunction, this LED lights; otherwise it is dark. |
| 4 | ON/OFF button | Control the start or stop of the unit. Under stop state, press the button (for 3s) to start up the unit. Under running state, press the button (for 3s) to stop the unit. |
| 5 | RESTORE button | Press this button to remove error and lock of exhaust temperature sensor. |
| 6 | UP button | Press this button to move the cursor upward or leftward. When modify the data, press this button to increase the value. |
| 7 | DOWN button | Press this button to move the cursor downward or rightward. When modify the data, press this button to decrease the value. |
| 8 | EXIT button | Press this button to return to last page. |
| 9 | CONFIRM button | Press this button to enter the next page. When modify the data, press this button to confirm the value and transfer the cursor. |

### 3.3 Display View




| NO. | Name | Function description |
|---|---|---|
| 1 | Time display | Display the current time. |
| 2 | Unit name | Unit name |
| 3 | Running state | Display the current running state of the unit. |
| 4 | Number of modules | The number of connected unit |
| 5 | ON/OFF mode | ON/OFF mode of the system |
| 6 | Running mode | Display the current running mode |

### 3.4 Wired Controller Operation Instructions

#### 3.4.1 Turning on/off of the Unit

The unit under non-commissioning state can be turned on/off via the manual mode or the timing mode. The manual mode is given priority to the timing mode.

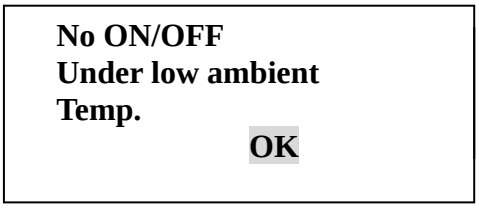
**●Manual mode：**

1)、Manual start: in the unit stop state, press the **on/off** button for 3 seconds and start the unit, and at that time the operation indicator is on. When the compressor begins to run after a delay, the manual starting process is finished.

2)、Manual stop: in the unit operation state, press the **on/off** button for 3 seconds and stop the unit, and at that time the operation indicator is off. When the unit stops, the compressor immediately ceases and the cooling tower fan, the cooling pump and the chilled water pump are shut off. The manual stop process is finished.

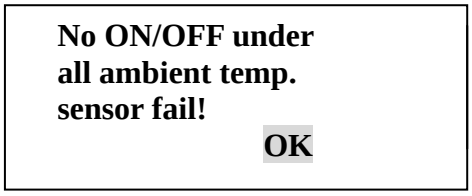
When ambient temperature is lower than -16℃, pressing the start/stop button, the

following prompt window comes up on the manual operator.



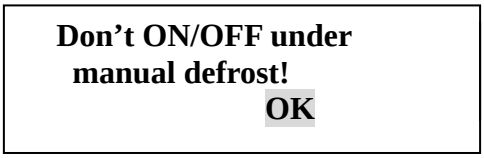

Press the **Confirm** button for acknowledgement.

If ambient temperature sensors of all linked units are at fault, pressing the on/off button, the following prompt window comes up on the manual operator.




Press the **Confirm** button for acknowledgement.

In the manual defrosting mode, pressing the on/off button, the following prompt window comes up on the manual operator.




Press the **Confirm** button for acknowledgement.

By pressing the **up selection** button or the **down selection** button, you can convert between **YES** and **NO**. Press the **Exit** to quit selection and go back to home page. When the unit is in the cooling & heat recovery mode stop state, if you select **YES** and press the **Confirm**, you can go back to the home page and the unit is in the heating & heat recovery operation state; and if you select **NO** and press the **Confirm**, you can go back to the home page and the unit is in the cooling & heat recovery operation state.

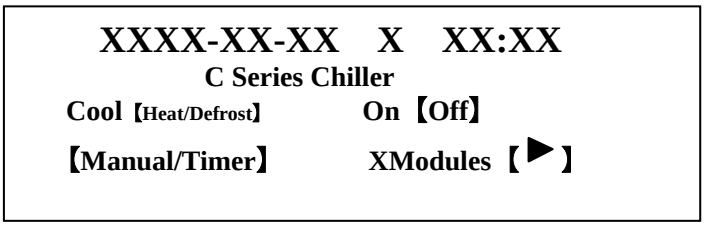
**●Timing mode:**

After the unit is energized or reset, press the **Manual Mode** to turn on/off the unit. Conversion between the manual mode and the timing mode is detailed in **3.4.2.2 Main Menu**

### 3.4.2 Menu Operation Instructions

#### 3.4.2.1 Home page

When the controller is powered on, the microcomputer will make a 3-second automatic detection and the LCD on the wired controller will display the following content.



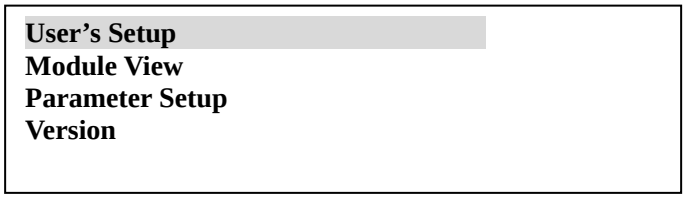

The content of **default home page menu** is dependent on system state. XX stands for year, month, day, hour and minute. Only one item or none is displayed in the“【】”, representing the start/stop state of the system, starting method and quantity of linked modules. Presence of the ▶ at the end means the system is at fault.

After entering into a menu item, if no operation is made on the Wired Controller within 10 minutes, the system will automatically go back to the above **default home page menu (Home Page)**.

Press the **Exit** button on the wired controller at any time for enough times, you can go back the default home page menu as shown above.

### 3.4.2.2 Main Menu

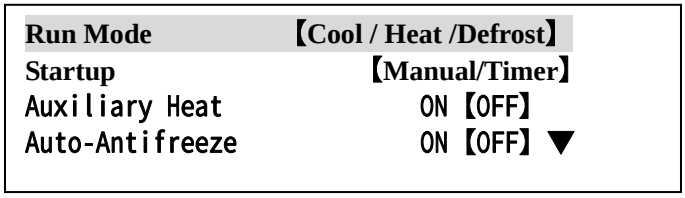
When home page is present on the screen as shown in the above drawing, press the **Confirm** to enter into the **Main Menu** and the following items is displayed on the screen.



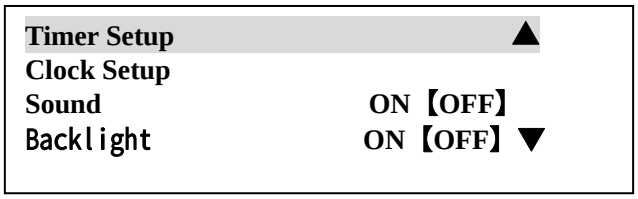

Press the **up or down selection button** to choose required function and press the **Confirm** button to go to the page. Only one item or none will be displayed in 【】 in the following graph. When a line or number is selected, it appears as white on black.

#### (1)、User's Setup

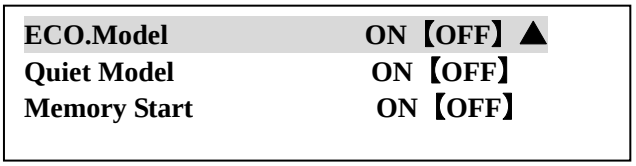
The following is basic settings most common for users. On the Main menu, select the **User's Setup** and press the **Confirm** to go to the sub-menu, as shown in the following drawing.




**Page 1**




**Page 2**



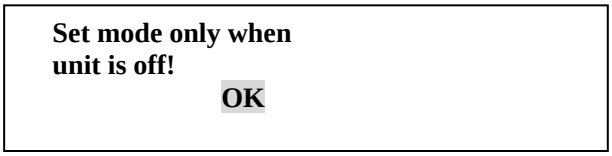

**Page 3**

Press the **Up or Down selection button** to choose a needed function and press the **Confirm** to go to or confirm the selection. The subsequent "**ON**" or "**OFF**", which means the function is selected or not.

a、**Run Mode Set**

Select the **Run Mode** and press the **Confirm** button, and the display on the screen is as follows:

Press the **Confirm** button to acknowledge a selected object, press the **Up or Down selection button** to change a selected object, and press the **Exit** button to cancel the model set. Different models have different display modes.If you is setting a mode in the startup state, the following prompt will appear:




Press the **Confirm** button for acknowledgement

**b. Startup mode set**

Select the **Startup** and press the **Confirm** button. The start/stop mode can be converted between the manual mode and the timing mode.

**c. Auxiliary Heater Function Set**

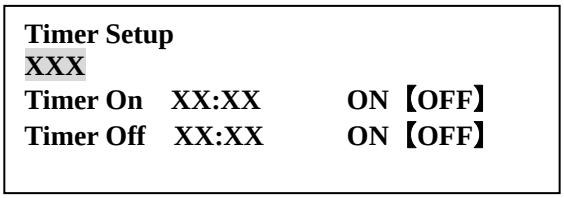
Select **Auxiliary Heat** and press the **Confirm** button, and the subsequent "**ON**" or "**OFF**", which means the function is selected or not.

**d. Auto-Antifreeze Protection Set**

Select **Auto-Antifreeze**, press **Confirm**, and the subsequent "**ON**" or "**OFF**", which means the function is selected or not.

**e. Timer Setup**

Select **Timer Setup** and press **Confirm** to go to the page as shown in the following drawing:




Press **Confirm** to change a selected object. Press **Up or Down** to change value or state of a selected object. This is timing on/off time and effective status each week. "**OFF**" represents the time set is invalid and "**ON**" means a valid time set. Press the **Exit** button to quit the page and go back to the previous menu and save set values.

**f. Clock Setup**

Select **Clock Setup** and press the **Confirm** button to go to the page. The following display is present on the screen.

Press the **Confirm** button to change a selected object. Press the **Up or Down** button to change value or state of a selected object. Press the **Exit** button to quit the page and go back to the previous menu and save set values.

g. **Sound On set**

Select **Sound**, press the **Confirm** button, and the subsequent "**ON**" or "**OFF**", which means the function is selected or not.

h. **Backlight On Set**

Select **Backlight**, press the **Confirm** button, and the subsequent "**ON**" or "**OFF**", which means the function is selected or not.

I . **ECO.Model Set**

Select **ECO.Model** , press the **Confirm** button, and the subsequent "**ON**" or "**OFF**", which means the function is selected or not.

J **Quiet Model Set**

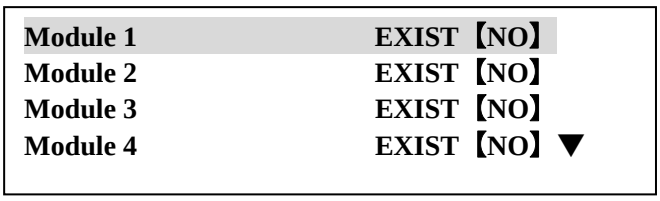
Select **Quiet Model** , press the **Confirm** button, and the subsequent "**ON**" or "**OFF**", which means the function is selected or not.

K **Memory Start Set**

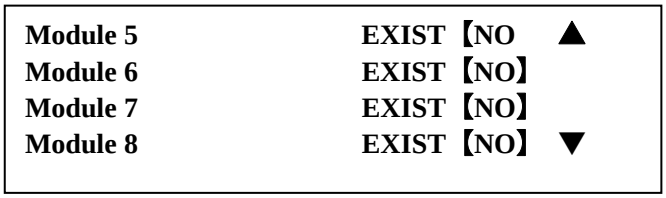
Select **Memory Start**, press the **Confirm** button, and the subsequent "**ON**" or "**OFF**", which means the function is selected or not. The function is for selecting whether the unit will memorize its operation state if power supply is shut down.

**(2). Module View**

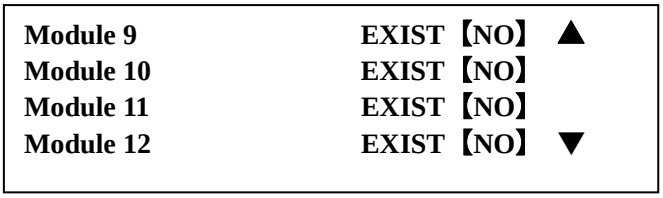
When the **Main Menu** is present on the screen, select **Module View**, press the **Confirm** to go to the pages as shown in the following drawing.



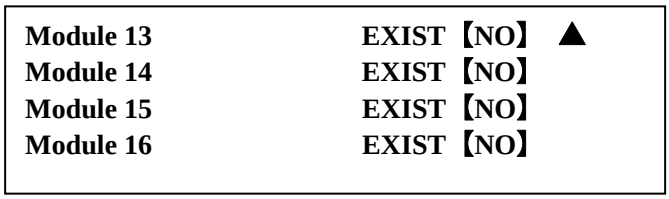

**Page 1**




**Page 2**



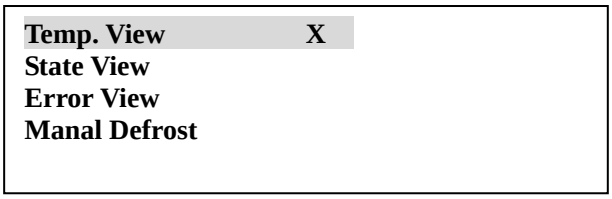

**Page 3**




**Page 4**

Press the **Exit** to quit the page and go back to the previous menu. Press the **Up or Down** button to select a needed module and press the **Confirm** button to go to corresponding page.

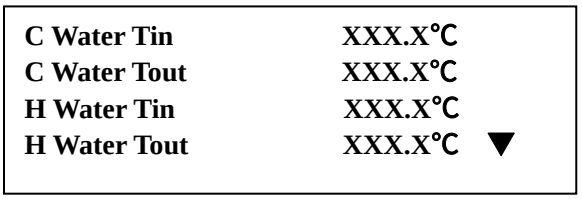
A module followed with "▶ "means having a failure. The following menu will display after going to the module.



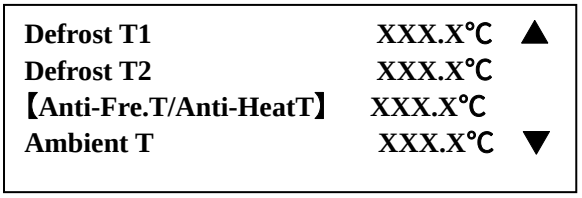

Press the **Exit** button to quit the page and go back to the previous menu. Press the **Up or Down** selection button to select a needed function and press the **Confirm** to go to corresponding page. "**X**"stands for one number of "1～16", meaning number of the selected module. The "▶ "following the **State View** represents the module provides auto freeze protection operation or defrosting operation. The "▶ "following the **Error View** represents the module is at fault.

a、**Temperature View**

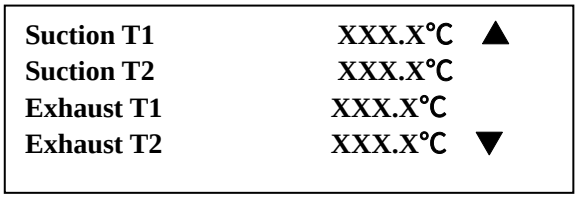
The function is for checking temperature at various temperature points. Select **Temp. View** and press the **Confirm** button to go to the pages as shown in the following drawings.



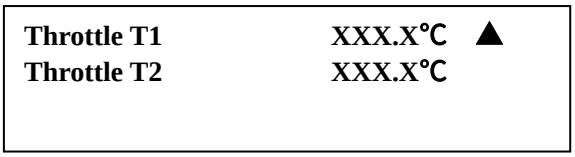

**Page 1**




**Page 2**




**Page 3**




**Page 4**

Press the **Up or Down** selection button to convert among the above four pages. Press the **Exit** button to quit the menu page and go back to the previous menu.

When **page 1** is present on the screen, press the **Reset** button and the **Exit** button simultaneously for 3 seconds, and **C Water Tin** and **H Water Tin**, as displayed previously, will be converted to **C Aver.Tin** and **H Aver.Tin**. And press again the **Reset** button and the **Exit** button simultaneously for 3 seconds, and **C Water Tin** and **H Water Tin** will be displayed again. As such, display can be converted between water inlet temperature and water inlet average temperature.

Only one item will be displayed in 【】 in **page 2**.When the run mode is cool or defrost, 【 **Anti-Fre.T/Anti-HeatT** 】 shows **Anti-Fre.T;** When the run mode is heat, 【**Anti-Fre.T/Anti-HeatT**】 shows **Anti-HeatT.**

**Note: above temperature display is dependent on unit model. If the temperature sensor is not existent for a certain model, "None" would be present on the display zone for corresponding temperature point.**

b、**State View**

Used for checking the on/off status of motors. Select the **State View** and press the **Confirm** to go to the pages as shown in the following drawings.

| | | |
|---|---|---|
| **Fan 1** | **ON【OFF】** | |
| **Fan 2** | **ON【OFF】** | |
| **Fan 3** | **ON【OFF】** | |
| **Sys.State** | **【Cool/Heat/Defrost/Anti-fre.】** | ▼ |

**Page 1**

| | | |
|---|---|---|
| **Compressor 1** | **ON【OFF】** | ▲ |
| **Compressor 2** | **ON【OFF】** | |
| **C Water Pump** | **ON【OFF】** | |
| **H Water Pump** | **ON【OFF】** | ▼ |

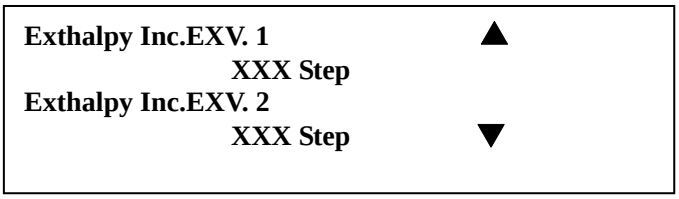
**Page 2**

| | | |
|---|---|---|
| **Ass. Heat 1** | **ON【OFF】** | ▲ |
| **Ass. Heat 2** | **ON【OFF】** | |
| **4-Valve 1** | **ON【OFF】** | |
| **4-Valve 2** | **ON【OFF】** | ▼ |

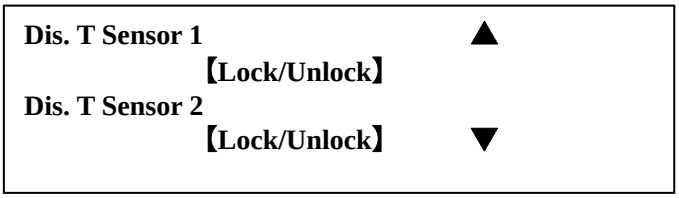
**Page 3**

| | | |
|---|---|---|
| **EXV. 1** | | ▲ |
| | **XXX Step** | |
| **EXV. 2** | | |
| | **XXX Step** | ▼ |

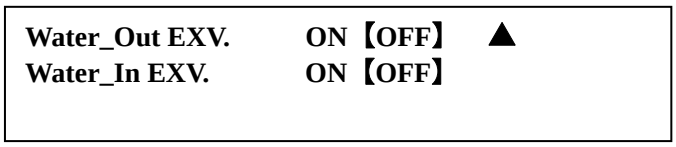
**Page 4**




**Page 5**




**Page 6**



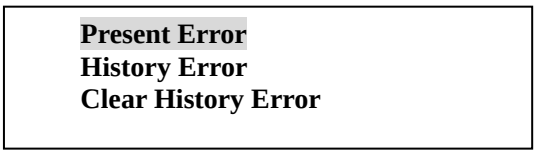

**Page 7**

Press the Up or Down selection button to convert among the above pages. Press the **Exit** button to quit the menu page and go back to the previous menu.

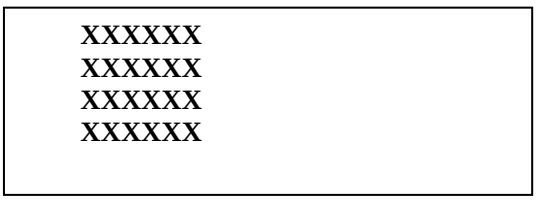
**Note: above temperature display is dependent on unit model. If the temperature sensor is not existent for a certain model, "None" would be present on the display zone for corresponding temperature point.**

c、**Error View**

Used for checking the failure status of the system. Select the **Error View** and press the **Confirm** to go to the pages as shown in the following drawings.




Press the **Exit** button to quit the page and go back to the previous menu. Press the **Up or Down** selection button to choose a needed module. When **Present Error** or **History Error** is selected, press the **Confirm** to go to the following interface.




"**XXXXXX**"are possible failures as listed in the following:

| | |
|---|---|
| **Comp.1 HP Pro** | **Dis T Sensor 2** |
| **Comp.1 OverLoad Pro** | **C Water-in Sensor** |
| **Fan1 OverLoad Pro** | **C Water-out sensor** |
| **Sys.1 Dis.HighTemp.** | **Anti-Frozen Sensor** |
| **C Water Flow Switch** | **Defrost T Sensor1** |
| **Fan3 OverLoad Pro** | **Defrost T Sensor2** |
| **Jumper Error** | **Ambient T Sensor** |
| **Com.2 HP Pro** | **Dis. T Sensor1** |
| **Comp.2 OverLoad Pro** | **Dis. T Sensor2** |
| **Fan2 OverLoad Pro** | **Thr. Valve1 Sensor** |
| **Sys.2 Dis.HighTemp.** | **Thr. Valve2 Sensor** |
| **H Water Flow Switch** | **Suction T Sensor1** |
| **Comp.1 LP Pro** | **Suction T Sensor2** |
| **Comp.2 LP Pro** | **LP Sensor1 Error** |
| **User Anti_fire Pro** | **LP Sensor2 Error** |
| **Dis T Sensor 1** | **H Water-in Sensor** |
| | **H Water-out Sensor** |

If the last line on the menu is followed with a "▼", more failures are available below. You can press the **Down** selection button for reading more failures. If the first line is followed with a "▲", more failures are available above. You can press the **Up** selection button for reading more failures. Press the **Exit** button to go back to the previous menu. Only the lasted four failures are remained even if quantity of history failures is more than 4,

In Fig. **3.4..2.1**, select **Clear History Error** and press the **Confirm** button to go to the following interface.

**Clear History Error**

**NO YES**

Press the **Up or Down** selection button to convert between **NO** and **YES**. Press **YES** to confirm and press **NO** to quit the menu and go back to the previous menu.

d. **Manual Defrost**

Used for starting or stopping manual defrosting. Select **Manal Defrost** and press **Confirm** to go to the following page.

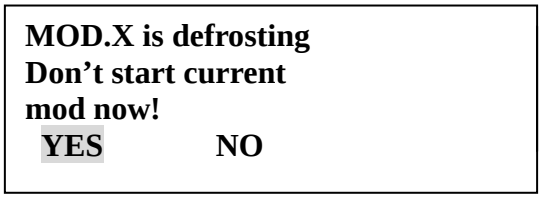
**MANUAL DEFR. X ON【OFF】**
**SYS. DEFR. ON【OFF】**
**Anti-Fre.T XXX.X℃**

Press **Confirm** to start or stop manual defrost and press **Exit** to quit the interface and go back to the previous menu.When manual defrost is on and the two systems do not stop defrosting

completely, the following prompt will come up.

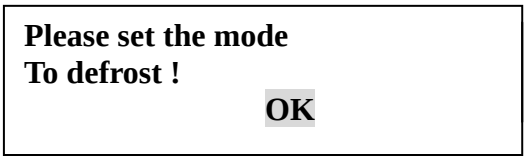
Press **Up or Down** button to convert between **YES** and **NO**, press Confirm for acknowledgement, press Exit to quit the menu and go back to the previous menu.

**Note:** manual defrost is not allowed for two modules simultaneously. If manual defrost is started for one module and such function is started for another module, the following prompt will appear:



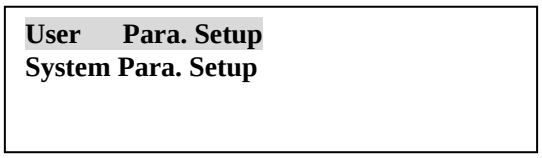

Press **YES** for acknowledgement.

If manual defrost is initiated for a certain module under non-manual defrost mode, the following prompt will be present:




**(3) Parameter Setup**

On the **Main Menu** on the screen, select **Parameter Setup** and press **Confirm** to go to the page as shown in the following drawing.




Press **Exit** to quit the page and go back to the previous menu. Press **Up or Down** selection button to select a needed setting interface.

a、**User-level Parameter Set**

Select the menu and confirm the selection for going to **User Para. Setup** menu. Press the **Up or Down** selection button to select the parameter to be modified and press **Confirm** to go to the modification page. Press the **Up or Down** selection button for entering parameters and press **Confirm** or **Exit** to go back to the parameter set menu. Other parameters can be modified in the same way. After entered **Default Parameter** option, System will inquire whether use Default Value, if **YES** is choosed,

then the parameters will be modified to Factory Default Value。After modification, press the **Up or Down** selection button to save parameter and quit the item. A prompt for asking whether to save the modification comes up again on the screen. Select Confirm to save it and go back to the Main menu. Please note that only in the above exit way can modifications be saved.

b、**System-level Parameter Set**

User shall not use the function unless under instruction of debug personnel if necessary, to prevent an accident. Code entry is essential for operating the function. Button points on how to operate: select the menu and confirm the selection, and a prompt of code entry appears on the screen; press the **Up and Down** selection buttons to enter correct password, press **Confirm** to confirm it, and go to **Parameter Set Menu**; press the **Up and Down** selection buttons to select parameters to be modified, press **Confirm** to go to modification interface, press the **Up and Down** selection buttons to enter parameter value, and press **Confirm** or **Exit** to go back to the **Parameter Set** menu; other parameters can be modified in the same way; After entered **Default Parameter** option, System will inquire whether use Default Value, if **YES** is choosed, then the parameters will be modified to Factory Default Value。after modification, press the **Up and Down** selection buttons to select **Save and Exit** item under the **Parameter Set** menu, and a prompt whether to save the modified values comes up again on the screen, and if you need to save them, you can select **OK** and then press **Confirm** to save modifications and go back to the Main menu. Please note that only in the above exit way can modifications be saved.

(4)、**Version Information**

Used for checking version number of software and hardware of the wired controller. On the **Main menu** on the screen, select **Version** and press **Confirm** to go to the page as shown in the following drawing.

| |
|---|
| Ver.: XXX<br>Data: XXXX.XX |

Press **Exit** to quit the page and go back to the previous menu.

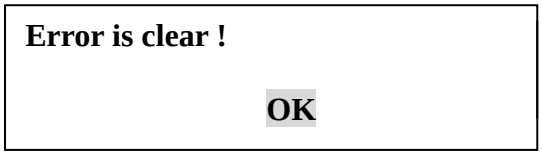
**3.4.2.3 Reset (for erasing error)**

On any interface, press **Reset**, the following page appears:

| |
|---|
| **Clear Error**<br>**Remove Dis Sensor** |

Press **Exit** to go back to the previous interface and press **Confirm** to select function as shown in the following:

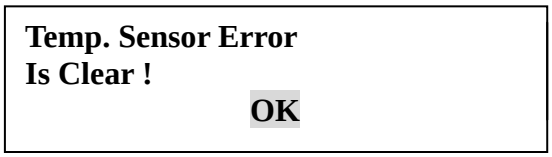
(1) **Erasing Error**




Press **Confirm** to confirm it and go back to the previous page.

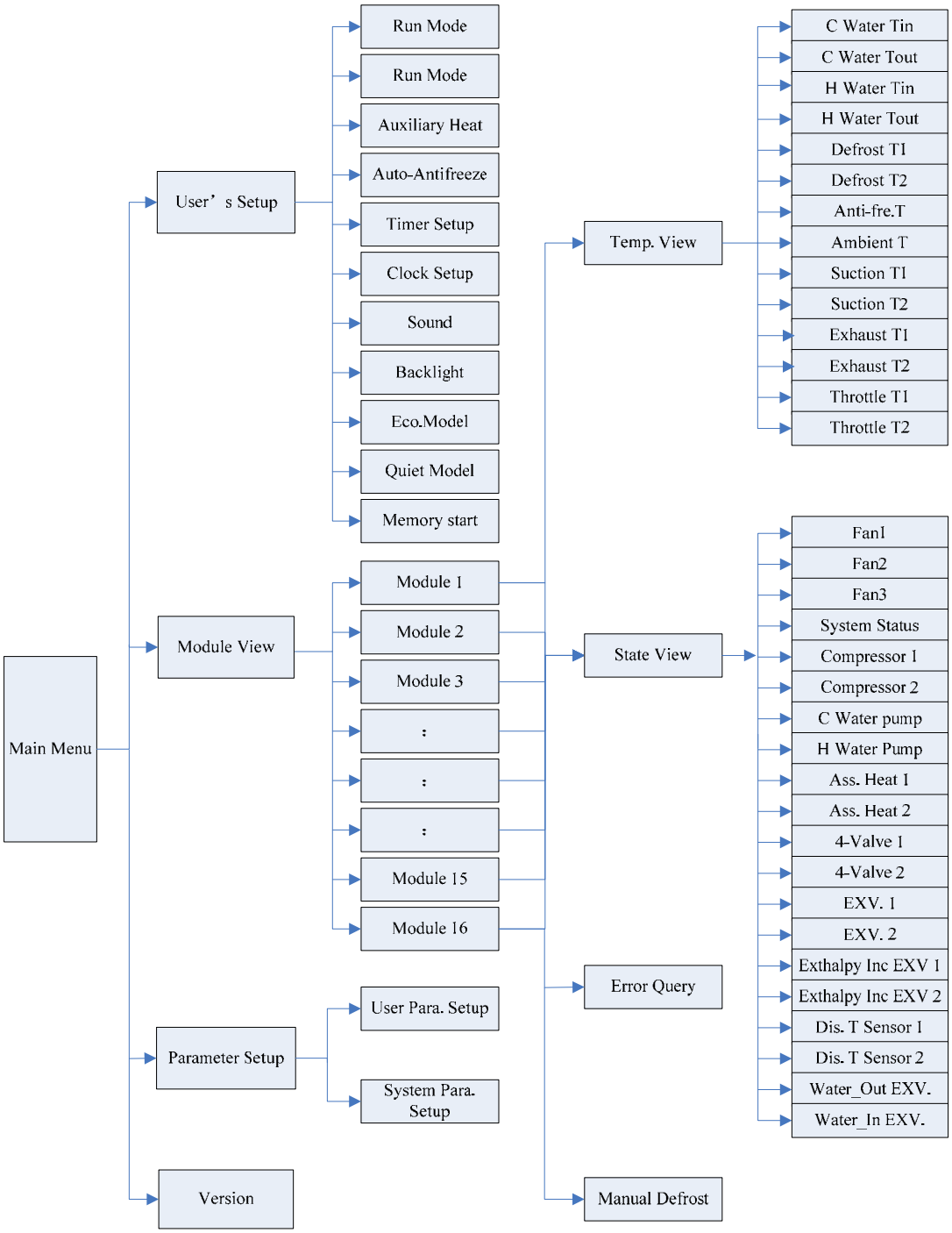
(2) **Relieve Discharge Temp. Sensor locking**

Press **Confirm** to go to **Code Entry** page and enter correct password to go to the following page




Press **Confirm** to confirm it and go back to previous page.

### 3.5 Controller Menu Structure




（1）User’s setup: It is the basic setting that commonly used by users, such as “mode setting” and “start-stop mode”.

（2）Module view: View the temperature, state, malfunction, defrosting of the module.

（3）Parameter setup: It can be divided into user parameter setup and system parameter setup.

（4）Version: View the version of the wired controller.

（5）This Wired Controller also be used in the other heat pump system, so some temperature

points （such as Suction T1 ,Suction T2 ,Throttle T1,Throttle T2）and EEV parameter is not used in this heat

system.

## 4. SKETCH MAP OF DIP SWITCH

Four bit toggle switches are used for indicating hardware address (1 16) of modules, with module No. displayed in turn on the panel as Module 1, Module 2, ……, Module 16. All of the modules which are connected with one wired controller, their toggle switches indicated the address should be different. Toggle switches 1, 2, 3 and 4 are binary code, with 1 for the lowest bit and 4 for the highest bit. Comparison drawings are as follows (Caution: only in the condition of power supply shutoff can toggle switches be set):

Note: either of HLR35SM/NaA-M ,HLR45SM/NaA-M can work in one system,but the address should be different and continuous.

# INSTALLATION

# UNITS INSTALLATION

## 1 UNITS INSTALL

1.1 Installation Positions

For indoor unit:
- Fix the indoor unit bracket to the wall using appropriate plugs and screws.
- Hang the indoor unit on the top wall mounting bracket.
- Fix the indoor unit at the bottom side using appropriate plugs and screws.

For outdoor unit:
- The installation is frost-free.
- The space around the unit is adequate for servicing.
- The space around the unit allows for sufficient air circulation.
- There is no danger of fire due to leakage of flammable gas.
- All piping lengths and distances have been taken into consideration.

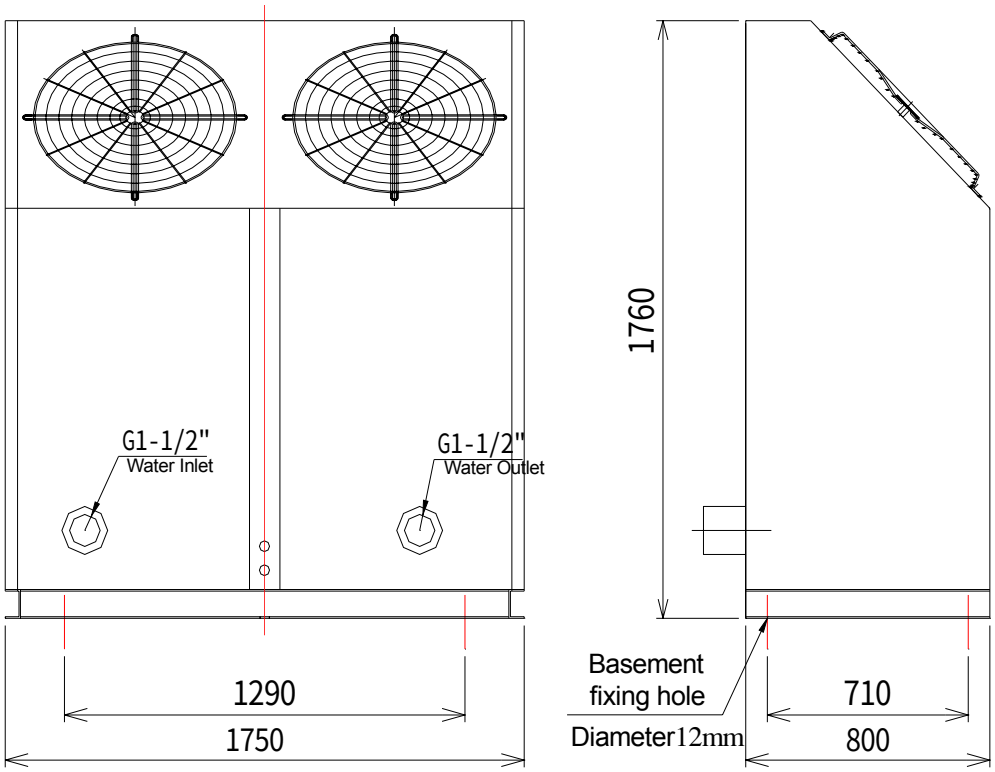
1.2 Matters need Attention

- The indoor unit is packed in a cardboard box, fixed by straps.
- At delivery, the unit should be checked and any demage should be reported immediately to the carrier claims agent.
- Check if all indoor unit accessories are enclosed.
- The indoor unit is heavy and should be lifted by two persons.

1.3 Dimension Data

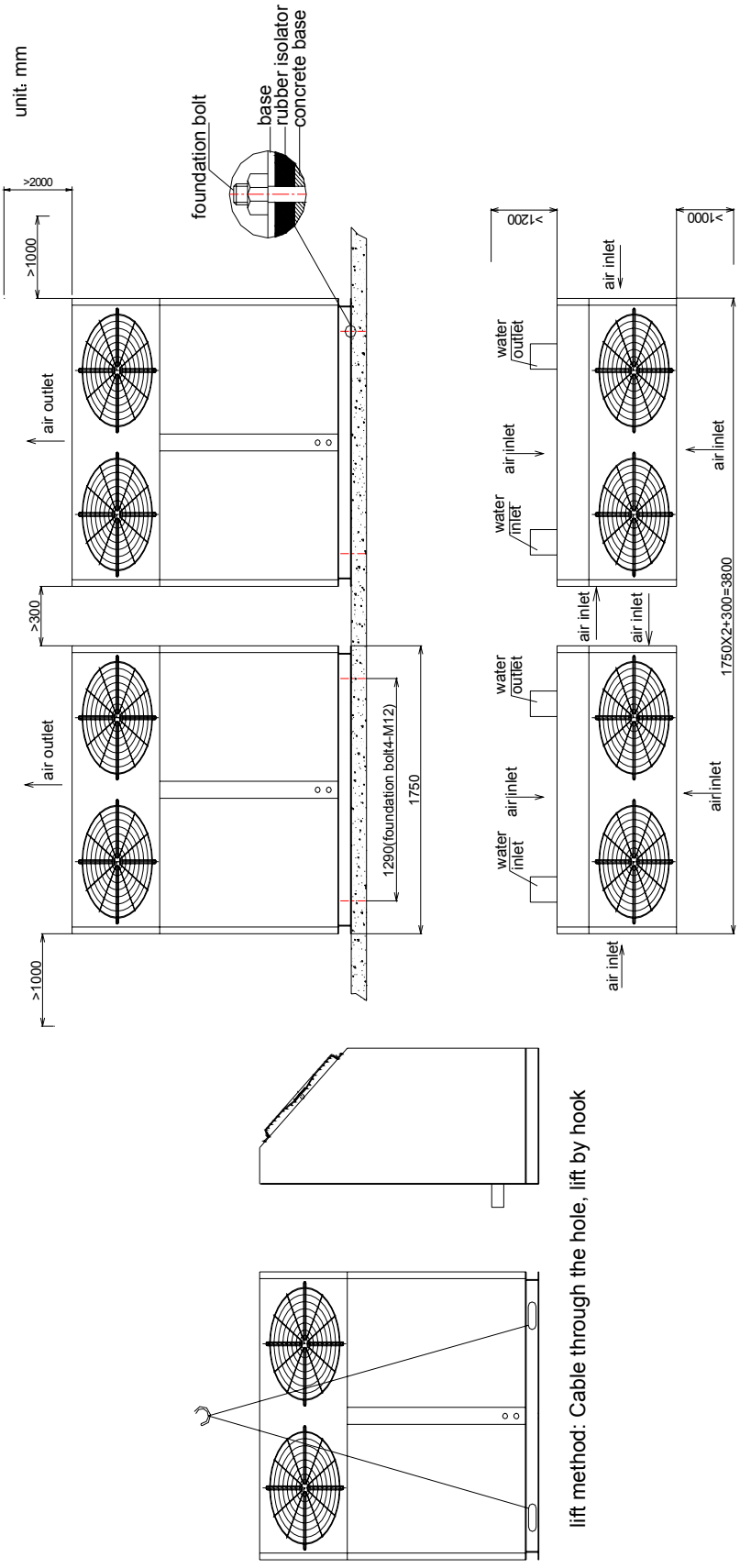
- Integral Type

HLR35SM/NaA-M, HLR45SM/NaA-M



## 1.4 Installation Clearance Data

### Integral Type



## 2 WATER PIPING WORK

2.1 Installation Procedure

For all guidelines, instructions and specifications regarding refrigerant pipework between the indoor unit and the outdoor unit. Please refer to the outdoor unit installation manual.
The units are equipped with a water inlet and water outlet for connection to a water circuit must be provided by a licensed technician and must comply with all relevant national regulations.

2.2 Matters of Attention

Air vents must be provided at all high points of the system. The vents should be located at points which are easily accessible for servicing. An automatic air purge should be used. Check the valve is not tightened too much so that automatic release of air in the water circuit remains possible.

2.3 Antifreeze

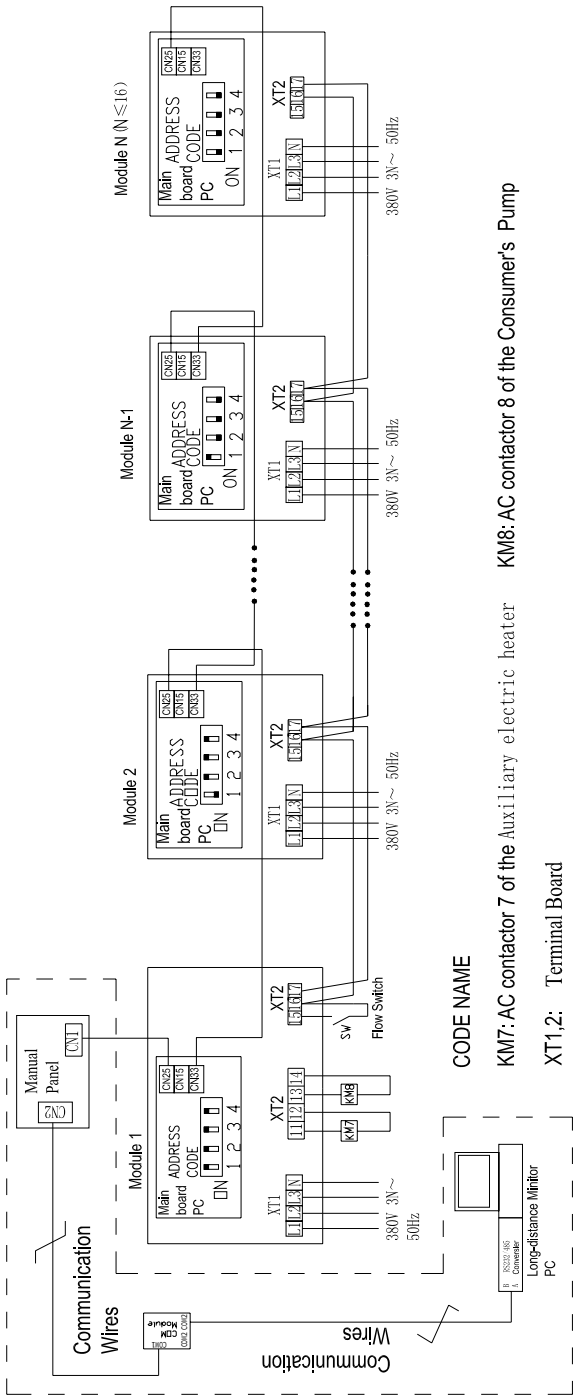
| % by Weight | 0 | 12 | 22 | 30 | 36 | 41 |
|---|---|---|---|---|---|---|
| Freezing Point℃（°F） | 0(32) | -5(23) | -10(14) | -15(5) | -20(-4) | -30(-22) |
| Ambient Temperature℃（°F） | 8.3(47) | 3.3(38) | -1.7(29) | -6.7(20) | -11.7(11) | -16.7(2) |
| Cooling Capacity Correction Factor | 1.0 | 0.985 | 0.980 | 0.974 | 0.970 | 0.965 |
| Water Flow Correction Factor | 1.0 | 1.02 | 1.04 | 1.075 | 1.11 | 1.14 |
| Pressure Drop Correction Factor | 1.0 | 1.07 | 1.11 | 1.18 | 1.22 | 1.24 |

## 3 ELECTRIC WIRING WORK

3.1 Wiring Principle

POWER SUPPLY — The electrical characteristics of the available power supply must agree with the unit nameplate rating. Supply voltage must be within the limits shown. See 3.3 for electrical and configuration data. FIELD POWER CONNECTIONS — All power wiring must comply with applicable local and national codes. Install field-supplied, branch circuit fused disconnect(s) of a type that can be locked off or open. Disconnect(s) must be located within sight and readily accessible.

3.2 Electrical Wires are Connected with Consumers




Notice:

1）、Auxiliary electric heater is optional part for heat pump unit.The diagram connected shown above.

2)、Use the 4-core communication wires to connect each module between CN33、CN25. Use a 3-core(2×1mm2) signal wires to connect the terminal 16,17 between each modules. Reference with the diagram shown above.

3)、Use a 3-core(2×1mm2)signal wires to connect the Water Flow Switch with the terminal 15,16 in one of the units.

4）.Use a 4-core(4×6mm2 ～16mm2) wires to connect each module terminal XT1 L1,L2,L3,N together.Reference with the diagram shown above.

3.3 Specification of Power Cord & Air Switch

| Model | Power Supply | Capability of Air Switch(A) | Minimum Sectional Area of Earth Wire($mm^2$) | Minimum Sectional Area of Power Cord($mm^2$) | supply cable |
|---|---|---|---|---|---|
| HLR35SM/NaA-M | 380 415V ,3Ph,50Hz | 50 | 10 | 10 | H07RN-F 5G10.0mm2 |

Note：

1.The power supply wire must be copper core wire, and the working temperature can not be higher than limited value.

2.If the length of power supply wire is longer than 15meters, do please increase the section area to avoid any accident due to over-load.

3. If the supply cord is damaged, it must be replaced by the manufacturer or its service agent or a similar qualified person in order to avoid a hazard.

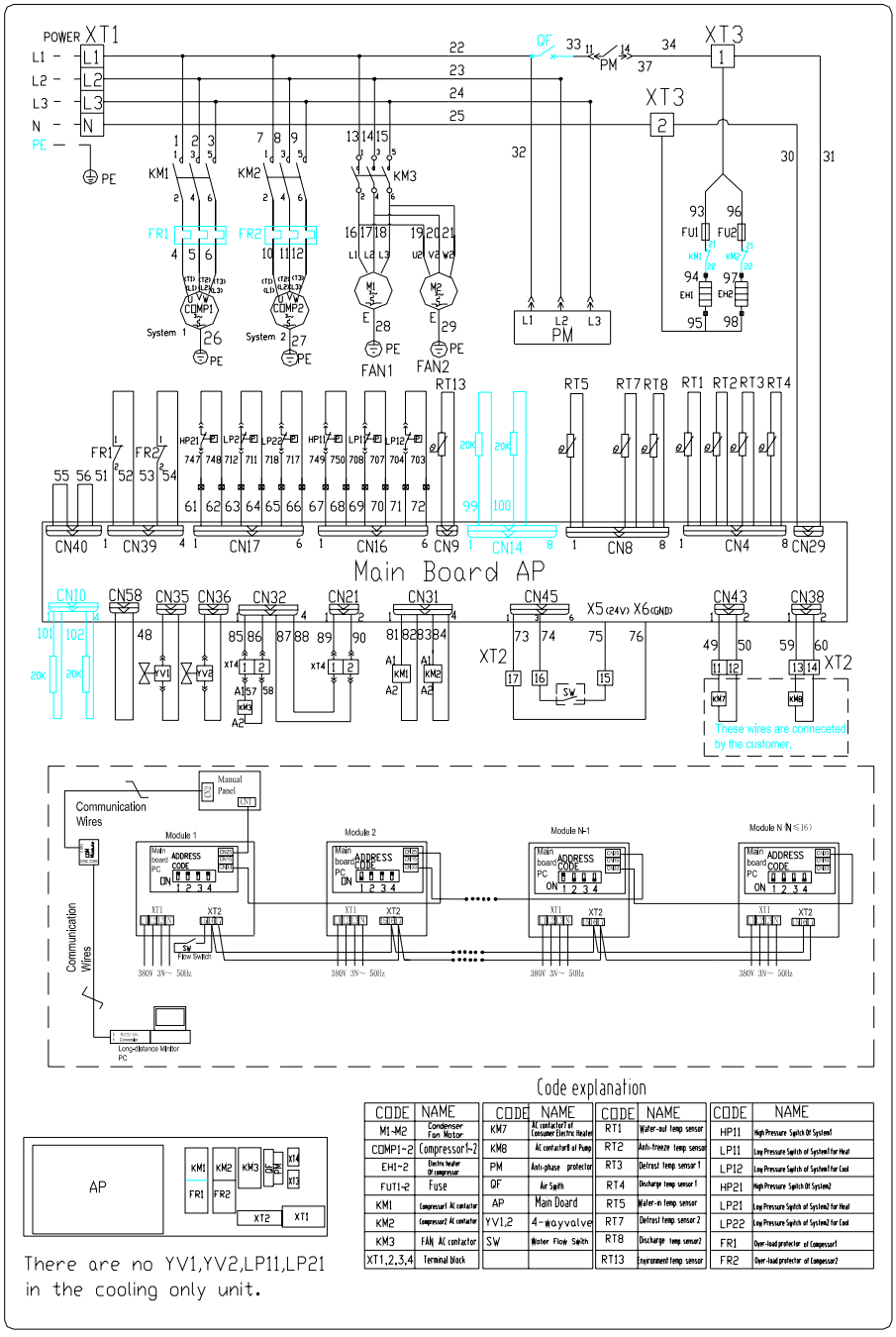
4. The appliance shall be installed according to national regulations

5. When installing the connection wiring for manual controller, the wire must be put inside a separate protective sheath to avoid direct sunshine.

## 3.4 Wiring Diagram

### 3.4.1 Wiring Diagram- Integral Type

HLR35SM/NaA-M:




| CODE | NAME |
|---|---|
| M1-M2 | Condenser Fan Motor |
| COMP1~2 | Compressor1~2 |
| EH1~2 | Electric heater Of compressor |
| FUT1~2 | Fuse |
| KM1 | Compressor1 AC contactor |
| KM2 | Compressor2 AC contactor |
| KM3 | FAN AC contactor |
| XT1,2,3,4 | Terminal block |

| CODE | NAME |
|---|---|
| KM7 | AC contactor7 of Consumer Electric Heater |
| KM8 | AC contactor8 of Pump |
| PM | Anti-phase protector |
| QF | Air Swith |
| AP | Main Board |
| YV1,2 | 4-wayvalve |
| SW | Water Flow Swith |

| CODE | NAME |
|---|---|
| RT1 | Water-out temp. sensor |
| RT2 | Anti-freeze temp. sensor |
| RT3 | Defrost temp. sensor 1 |
| RT4 | Discharge temp. sensor 1 |
| RT5 | Water-in temp. sensor |
| RT7 | Defrost temp. sensor 2 |
| RT8 | Discharge temp. sensor2 |
| RT13 | Environment temp. sensor |

| CODE | NAME |
|---|---|
| HP11 | High Pressure Switch Of System1 |
| LP11 | Low Pressure Switch of System1 for Heat |
| LP12 | Low Pressure Switch of System1 for Cool |
| HP21 | High Pressure Switch Of System2 |
| LP21 | Low Pressure Switch of System2 for Heat |
| LP22 | Low Pressure Switch of System2 for Cool |
| FR1 | Over-load protector of Compressor1 |
| FR2 | Over-load protector of Compressor2 |

# MAINTENANCE

# UNITS MAINTENANCE

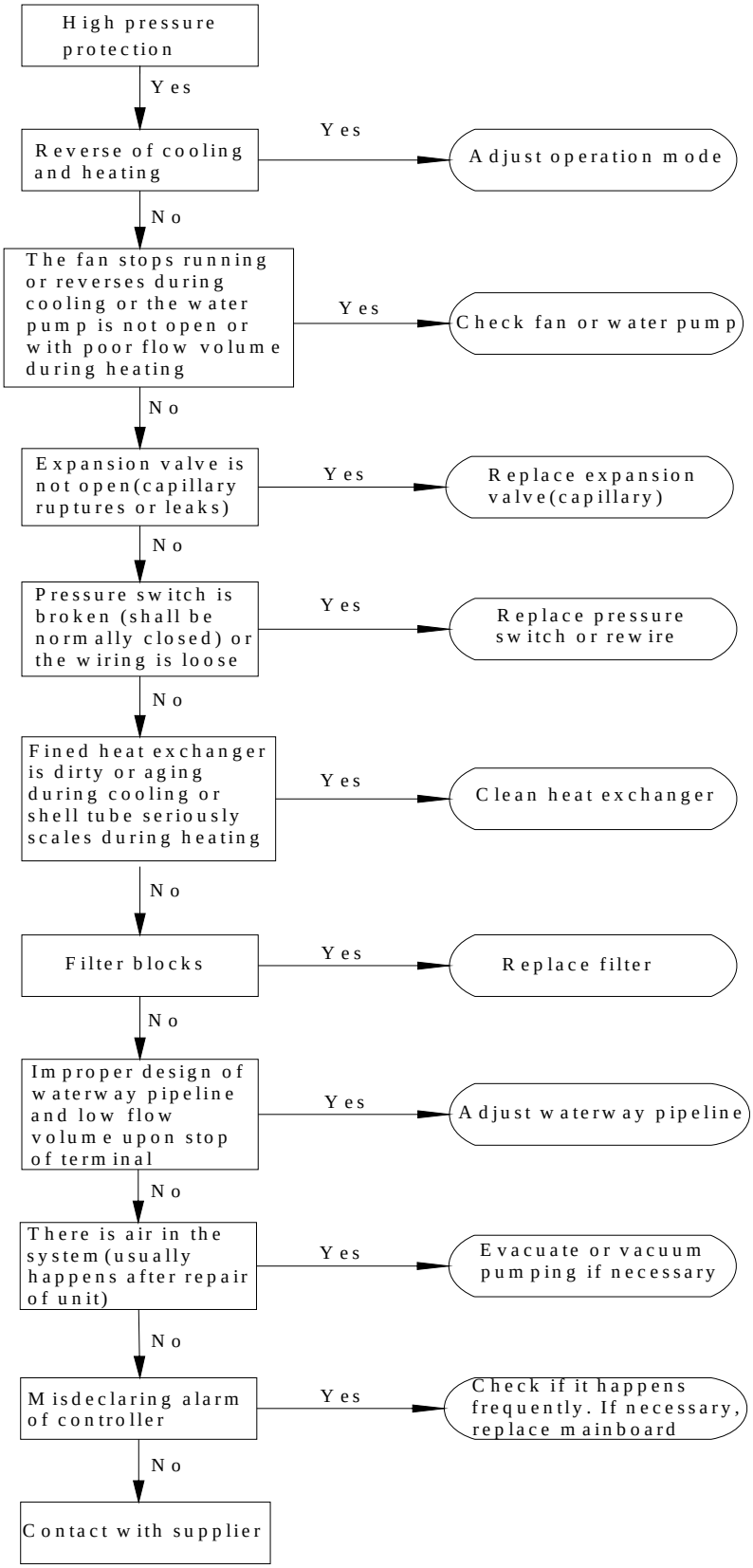
## 1 TROUBLE TABLE

| Name of Error | Source of Error Signal | Description |
|---|---|---|
| high pressure of compressor 1 (compressor 2) | high pressure switch of system 1 (system 2) | If the high pressure switch of compressor 1 (compressor 2) disconnects, the corresponding compressor will stop. If both compressors stop, the two fans will stop later.<br>The error LED of the display board lights and the corresponding alarm mark will be shown in “malfunction view”. The error must be removed manually before the unit resume normal running. |
| low pressure of compressor 1 (compressor 2) | low pressure switch of system 1 (system 2) | If the low pressure switch of compressor 1 (compressor 2) disconnects, the corresponding compressor will stop. If both compressors stop, the two fans will stop later. The error can be removed automatically for 5 times while it can not resume automatically for the 6$^{th}$ time. If it is detected for 3 times in one hour, it can not resume automatically. The corresponding marks will be shown in “error view”. It is required to remove the error manually.<br>When the display board is off, the low pressure will not be detected. In automatic anti-freezing and defrosting mode, after startup of the water pump, the low pressure will be detected by pressing heating low pressure button.<br>When the display board is on, if the low pressure is lower than heating low pressure protection value, the controller will send “low pressure protection” signal. The error can not be removed unless repaired by service man. When the compressor stops running, if the low pressure is lower than heating low pressure, the controller will send “low pressure protection” signal. The error can not be removed unless repaired by service man. |
| discharge high temperature protection of compressor 1 (compressor 2) | discharge temperature sensor system 1 (system 2) | If the discharge high temperature protection (≥130°Cstart protection; the resume value is 85°C) of compressor 1 (compressor 2) is detected, the corresponding compressor will stop. If both compressors stop, the two fans will stop later.<br>The error LED of the display board lights and the corresponding alarm symbol will be shown in “malfunction view”. The error must be removed manually before the unit resume normal running. |
| overcurrent of compressor | overcurrent protector of compressor | If the overcurrent of compressor 1 (compressor 2) is detected, the corresponding compressor will stop. If both compressors stop, the two fans will stop later.<br>The error LED of the display board lights and the corresponding alarm symbol will be shown in “malfunction view”. The error must be removed manually before the unit resume normal running. |

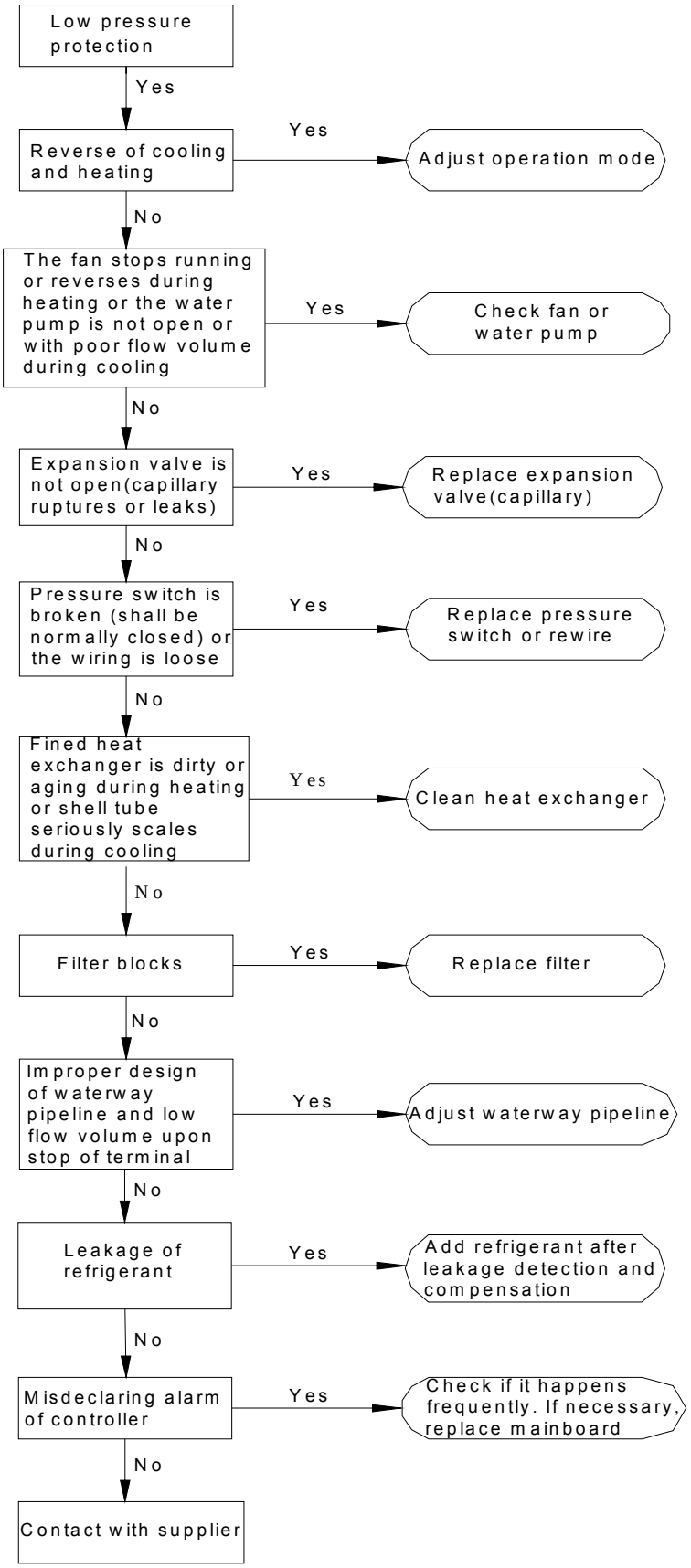
| | | |
|---|---|---|
| temperature sensor protection | temperature sensor | The successive detecting time: if it is detected that the abnormality lasts for 5s, it is error; if it is detected that the normality lasts for 3s, it is normal.<br>When the inflow water temperature sensor is wrong, all the compressor of this module will stop immediately.<br>When the suction temperature sensor 1（2） is wrong, the corresponding compressor will stop. If both compressors stop, the fan will stop 30s later. As the outflow water temperature sensor is not related to the logic control, when there is error, the compressor will not stop, but the malfunction is displayed on the display board.<br>When the anti-freezing temperature sensor and ambient temperature sensor is wrong, the compressor of this module will stop immediately and the fan will stop 30s later.<br>If the defrosting sensor 1 (2) is wrong, the corresponding compressor will stop during heating mode and cooling mode.<br>If there is signal of temperature sensor malfunction and it resume to normal automatically, the error mark will be removed automatically. But if it occurs 3 times in one hour or it can not resume to normal automatically, it is necessary to remove it manually. The error LED of the display board lights and the corresponding alarm symbol will be shown in “malfunction view”. |
| Water flow switch protection | mainboard contact | When a module detects that the water flow switch is closed (in normal state, when the water pump is running, the water flow switch is open) for 10s, the compressor of this module will stop and the fan will stop 30s later. The four-way valve remains the original state. The expansion valve keeps the initial steps.<br>When water flow switch protection occurs for all the modules, the water pump will stop after the compressor stops for 10s. |
| communication error | mainboard | When the information of the display board is not received for 30s, this module will stop automatically. For the module with communication error, its water pump will stop 5 min after the compressor stops. |

## 2 FLOW CHART OF TROUBLESHOOTING

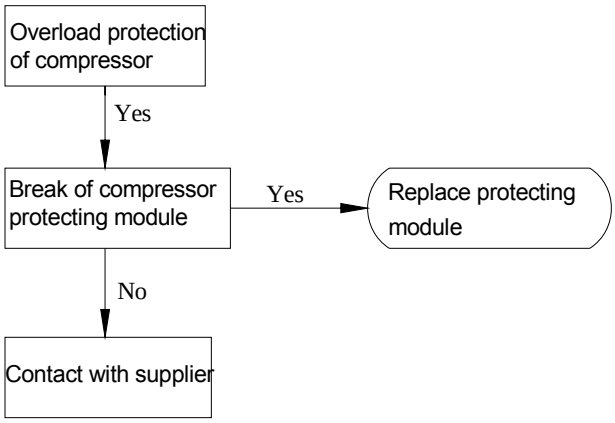
1. High Pressure Protection(E1)


High pressure protection
Yes
Reverse of cooling and heating
Yes
Adjust operation mode
No
The fan stops running or reverses during cooling or the water pump is not open or with poor flow volume during heating
Yes
Check fan or water pump
No
Expansion valve is not open(capillary ruptures or leaks)
Yes
Replace expansion valve(capillary)
No
Pressure switch is broken (shall be normally closed) or the wiring is loose
Yes
Replace pressure switch or rewire
No
Fined heat exchanger is dirty or aging during cooling or shell tube seriously scales during heating
Yes
Clean heat exchanger
No
Filter blocks
Yes
Replace filter
No
Improper design of waterway pipeline and low flow volume upon stop of terminal
Yes
Adjust waterway pipeline
No
There is air in the system(usually happens after repair of unit)
Yes
Evacuate or vacuum pumping if necessary
No
Misdeclaring alarm of controller
Yes
Check if it happens frequently. If necessary, replace mainboard
No
Contact with supplier

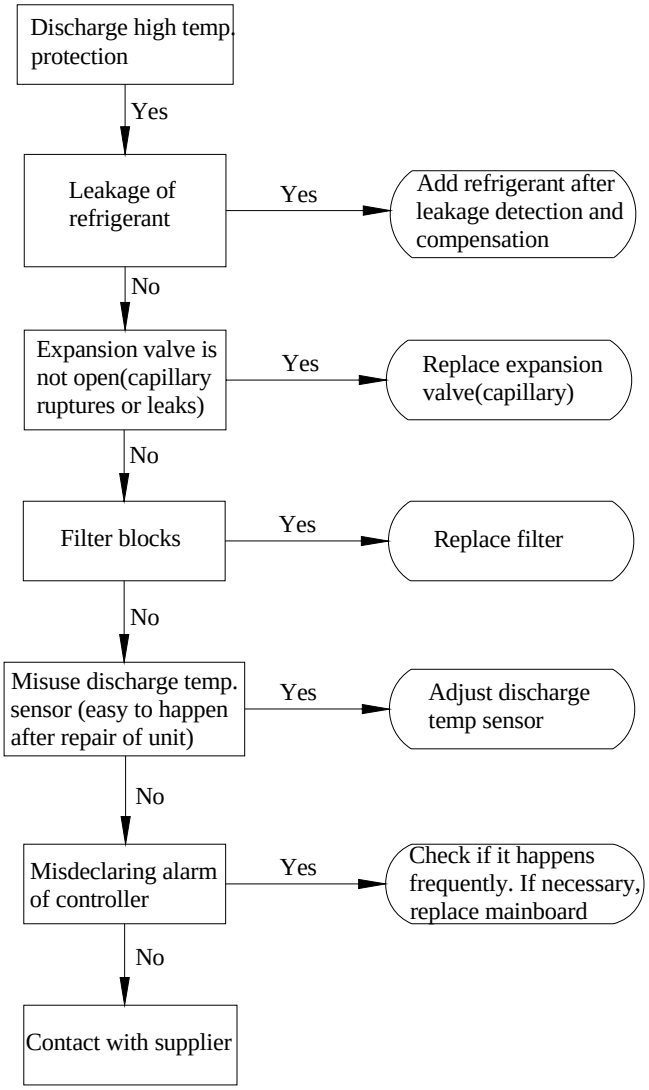
## 2. Low Pressure Protection(E3)



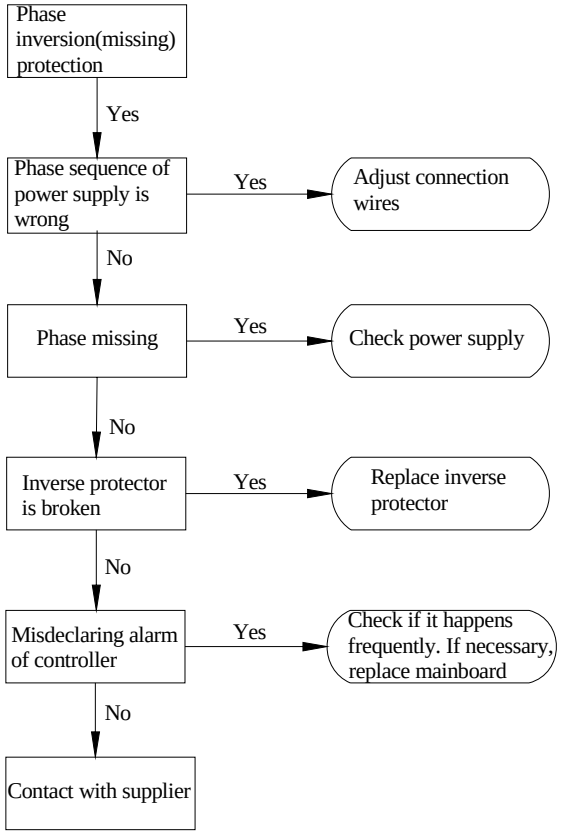
3. Overload Protection(E5)




4. Discharge High Temperature Protection(E4)



## 5. Phase Inversion (missing) Protection(Power Off)



# 3 DISASSEMBLY AND ASSEMBLY PROCEDURE OF MAIN PARTS

## 3.1 Integral Type

**(1) Remove the front case**

·Loosen the tappong screws fixing the front case. （See Fig. 1）
·Pull down and remove the front case.（See Fig. 2）

Fig. 1

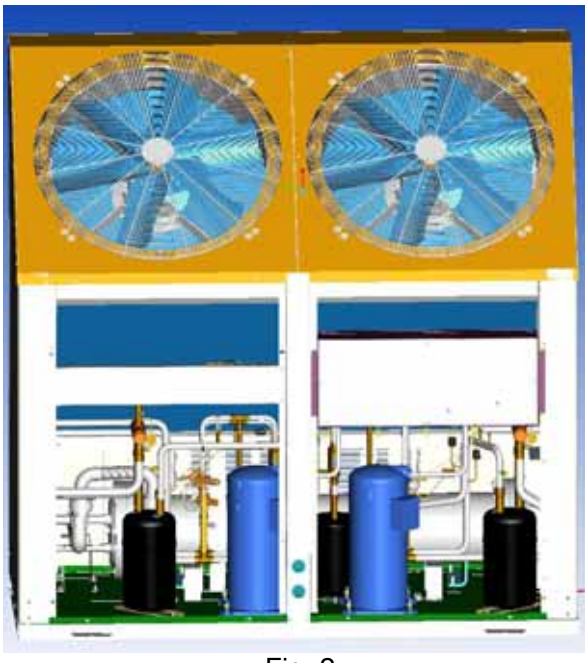
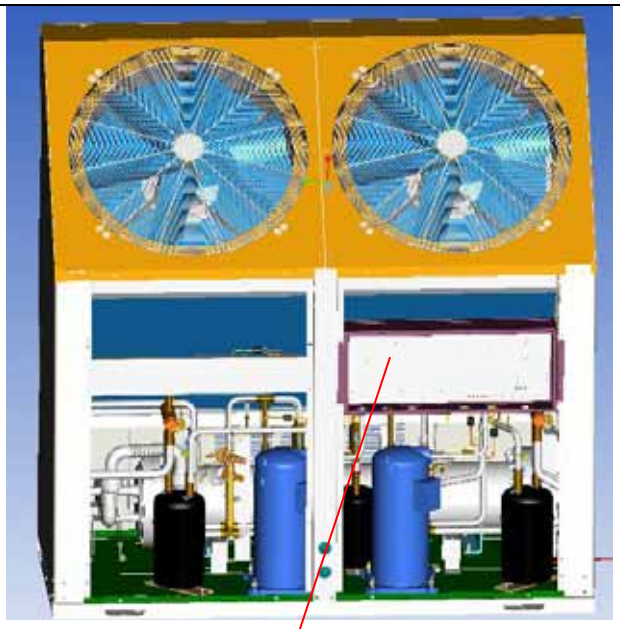


Fig. 2

**(2) Remove electric box**

Loosen the screws fixing the box cover. Remove all pressure switches and temp. sensor.（See Fig.3）



Electric box

Fig. 3

**(3)Remove the shell and tube heat-exchanger**

welding out the pipes connected to the shell and tube heat-exchanger. Remove the shell and tube heat-exchanger.（See Fig. 4）

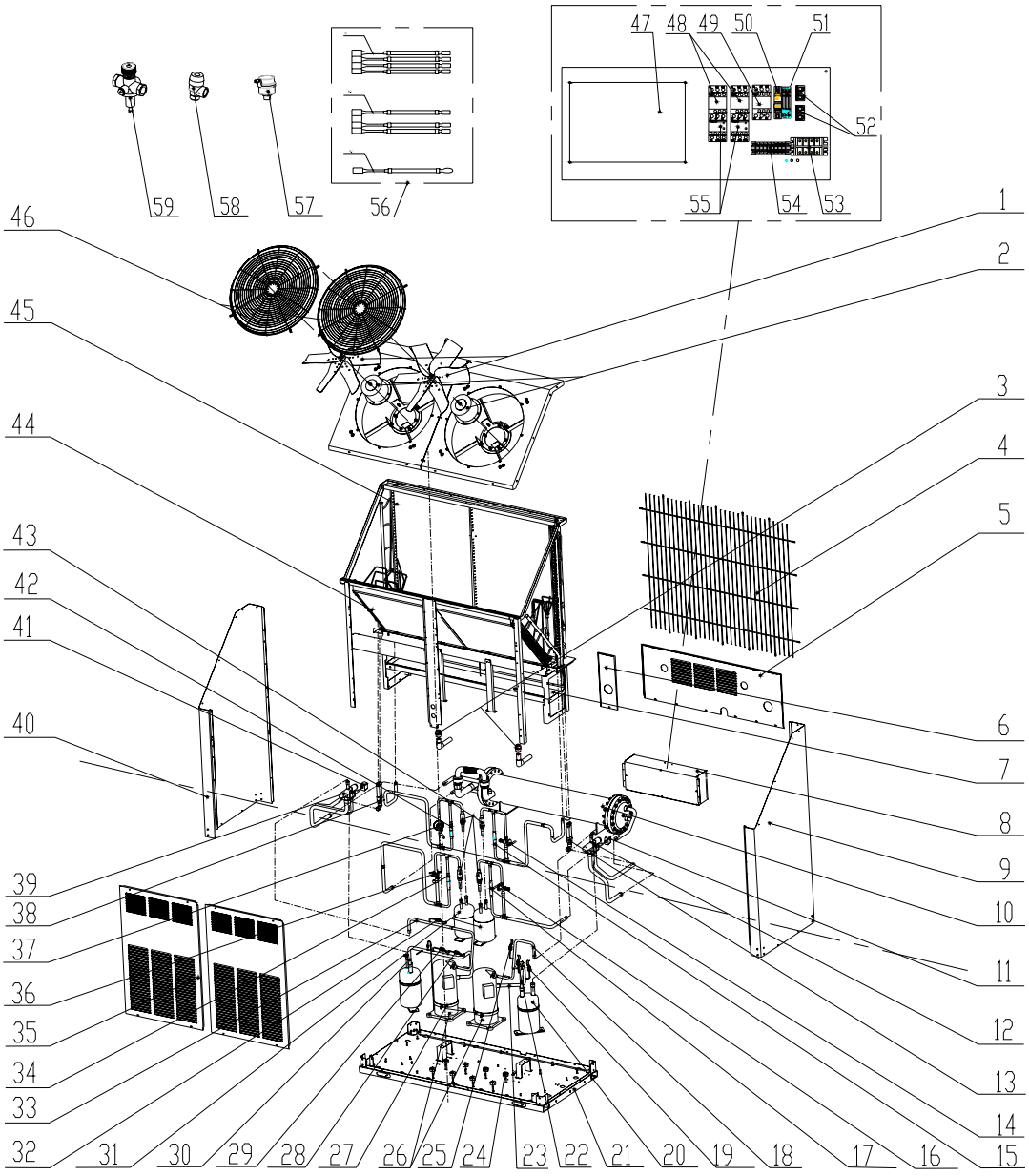
Shell and tube heat-exchanger
Fig. 4

# 4 EXPLODED VIEW AND PARTS LIST

## 4.1 Exploded View and Parts List- Integral Type

**Model：HLR35SM/NaA-M**

Exploded view：



Parts List：

| No. | Name of part | Part code | Quantity |
|---|---|---|---|
| 1 | Centrifugal Fan | 10518601 | 2 |
| 2 | Fan Motor | 15018606 | 2 |
| 3 | Pipe Connector | 06128301 | 2 |
| 4 | Front Grill | 01238202 | 1 |
| 5 | Back Side Plate 4 | 01312124P | 1 |
| 6 | Back Side Plate 1 | 01302107 | 1 |
| 7 | Water Collecting Tray Sub-Assy | 01272103 | 1 |
| 8 | Electric Box Assy | 01392412 | 1 |
| 9 | Right Side Plate | 01308276 | 1 |
| 10 | Dry Evaporator | 01050816 | 1 |
| 11 | Magnet Coil | 4300040031 | 1 |
| 12 | 4-way Valve | 43000339 | 1 |
| 13 | Current Divider | 03410101 | 1 |
| 14 | Thermal Expansion Valve | 07332226 | 1 |
| 15 | One way Valve | 07135801 | 1 |
| 16 | Thermal Expansion Valve | 07332226 | 1 |
| 17 | One way Valve | 07135801 | 1 |
| 18 | Discharge Tube Sub-Assy 2 | 04632240 | 1 |
| 19 | Pressure Protect Switch | 4602001510 | 1 |
| 20 | Gas-liquid Separator | 07424144 | 1 |
| 21 | Base Frame Assy | 01282297P | 1 |
| 22 | Pressure Protect Switch | 4602001513 | 1 |
| 23 | Inhalation Tube Sub-Assy 2 | 04672264 | 1 |
| 24 | Compressor Gasket | 02118049 | 8 |
| 25 | Pressure Protect Switch | 4602001546 | 1 |
| 26 | Compressor and fittings | 00202231 | 2 |
| 27 | Electric heater(compressor) | 76515404 | 2 |
| 28 | Pressure Protect Switch | 4602001515 | 1 |
| 29 | Pressure Protect Switch | 4602001512 | 1 |
| 30 | Inhalation Tube Sub-Assy 1 | 04672263 | 1 |
| 31 | Accumulator | 07422206 | 2 |
| 32 | Pressure Protect Switch | 4602001547 | 1 |
| 33 | Discharge Tube Sub-Assy 1 | 04632239 | 1 |
| 34 | One way Valve | 07135801 | 1 |
| 35 | Front Side Plate | 01302103 | 2 |
| 36 | Thermal Expansion Valve | 07332226 | 1 |
| 37 | Thermal Expansion Valve | 07332226 | 1 |
| 38 | Current Divider | 03410101 | 1 |
| 39 | 4-way Valve | 43000339 | 1 |
| 40 | Left Side Plate | 01308274 | 1 |
| 41 | Magnet Coil | 4300040032 | 1 |
| 42 | One way Valve | 07135801 | 1 |
| 43 | Strainer | 07210037 | 4 |
| 44 | Condenser Assy 2 | 01108240 | 1 |
| 45 | Condenser Assy 1 | 01108239 | 1 |
| 46 | Front Grill | 01238214 | 2 |
| 47 | Main Board | 30220034 | 1 |
| 48 | AC Contactor | 44010214 | 2 |
| 49 | AC Contactor | 44010232 | 1 |
| 50 | Single-phase Air Switch | 45020203 | 1 |
| 51 | Phase Reverse Protector | 46020054 | 1 |
| 52 | Terminal Board | 42011103 | 2 |
| 53 | Terminal Board | 42011051 | 1 |
| 54 | Terminal Board | 42011204 | 1 |
| 55 | Thermal Overload Relay | 44020415 | 2 |
| 56 | Sensor sub-assy | 39008071 | 1 |
| 57 | Auto Air Outlet Valve | 07108208 | 1 |
| 58 | Relief Valve | 07188204 | 1 |
| 59 | Auto Water Replenishing Valve | 07108207 | 1 |